

Liaison-4

DEC 1957

MEMORANDUM FOR: Mr. Marshall M. Smith
Deputy Assistant Secretary for International Affairs
Department of Commerce
Washington 25, D. C.

SUBJECT: Request for Purchase of Worden Gravimeters from
Texas Instruments, Inc., Houston, Texas

1. As promised you yesterday at the EDAC Meeting, I am providing you in this memorandum some background information on and intelligence pertinent to the subject request for purchase.

2. A first attempt to purchase two Worden gravimeters from Texas Instruments, Inc., Houston, was made by the Polish Government in June 1956. Request for the issuance of an export license was refused in August 1956. This refusal was received favorably by Mr. Worden who has no desire to export to Bloc countries. The Polish request was renewed in April 1957, with justification citing that the gravimeters were necessary for use in the IOY Program. Previously, the Soviets had attempted to obtain Worden gravimeters for use in their Arctic IOY Program and were willing to pay more than twice the actual price for these gravimeters if the normal agreement for servicing by Texas Instruments, Inc. were waived. No order was taken. An informal interdepartmental working group on the IOY, made up of working level scientific and technical personnel of the Air Force, State, and CIA, in a meeting of 1 May 1957, reviewed State Despatch 461, 15 April 1957, from US Embassy, Warsaw, which reported a request from the Poles for these gravimeters for IOY use. The working group felt that there was a possibility that this request represented an attempt by the Soviets to obtain, through another channel, the Worden gravimeters previously denied them. On 24 May 1957, the Chairman of the Operating Committee of ACEP stated that no export license for these gravimeters was outstanding. When it was learned in October 1957 that a license had been granted to Texas Instruments, Inc. for shipment of the gravimeters to Poland, the working group met again on 30 October 1957. A CIA participant stated that information had been received that VARIMEX, the Polish importing agency, had stated that the gravimeters requested were for use in the work of the International Geophysical Year and would not leave Poland unless a decision was made to send them to the Antarctic. The working group felt that this report increased the likelihood that the equipment is destined for use by the Soviet Union, since Poland is not conducting IOY activities in the Antarctic.

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3. The Worden gravimeter has some unique characteristics which include high accuracy, resulting from a low drift rate, combined with compactness and transportability which facilitates ease of operation in field survey. Other transportable gravimeters have a much higher drift rate. Drift rate is a measure of the effects on the mechanism resulting from changes in pressure, temperature, and other sudden changes or movements. Those instruments with higher drift rates must be frequently returned from field survey to base stations for checking against pendulum values. The more frequently that this is required the more inefficient and time-consuming is a given survey operation. The Soviet Bloc has not produced gravimeters with low drift rates that combine desired accuracy and portability for rapid field operations. In fact, no country but the United States has developed a gravimeter with a combination of advantages found in the Worden product. Therefore, the Soviet Bloc is unable to obtain an equally satisfactory gravimeter by purchase elsewhere. The vital parts of the Worden gravimeter are sealed in a cell which only the manufacturer can service. To date, there have been no known attempts to force the inner cell for copies of the design and we have no evidence that a Worden gravimeter has found its way into any of the Soviet Bloc countries.

4. Gravity data are used for geodetic and mapping purposes. The Soviet Union has completed a systematic gravity survey of the USSR. The Soviet gravity net is being extended into adjoining neutral countries in association with the Bloc aid program in the geological and resource exploration in these countries. These gravity data are not being made available to the Free World. This fact has been explicitly established in conversation with Soviet IGY scientists on several separate occasions. From a military point of view, gravity data are essential to the determination of the shape of the earth. Knowledge of the earth's shape increases as gravity data are acquired over all parts of the earth's surface. With the advent of missile weapons systems, accurate geodetic positioning of target areas becomes increasingly important. This accuracy depends upon the accumulation of gravity data over the entire earth's surface. Furthermore, preliminary studies indicate the need for knowledge of gravity anomalies which have an effect upon ballistic missiles in flight. It is suspected that the Soviet Union is more advanced than the Free World in the accumulation of these data largely because the more recent gravity data for the Bloc have not been made available to the western world, whereas our data have been readily available to them. It is interesting to note that the Department of Defense has taken action to classify gravity data as secret.

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5. The only two uses for gravimeters within the IGY Program are for studies of earth tides, for which the Worden gravimeter is not suitable, and for glaciological studies being conducted in Antarctica, for which the Worden gravimeter is particularly suited. The Polish request specified that the gravimeters in question were to be used in their participation in the IGY Program. It is true that the Poles are committed to take gravity observations at Poznan, Borowiec, and Borowa Gora, but these are for earth tide studies and can be obtained by pendulum instruments which they have. It is recognized that there are gravimetric studies requiring portable instruments which are adjunct to the IGY Program. In view of this, the Polish statement of April 1957 that these Worden gravimeters are absolutely necessary to Polish scientists for making gravimetric measurements recommended by the IGY is difficult to understand and, in our judgment, is not warranted. It would appear that a more suitable instrument for obtaining the gravimetric data for which the Poles are committed would be the LaCoste-Romberg earth tide gravimeter which is readily available and has no military significance to our knowledge.

6. It does not appear that these Worden instruments are necessary to the civilian economy of Poland. On the other hand, it does appear that they have strategic importance adverse to our national interests in that their availability to the Soviets would facilitate their maintaining their lead in the establishment of a world geodetic system based on gravity data which is a prime military goal.

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OTTO E. GUTHRIE
 Assistant Director
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